

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claims 1-7 (Cancelled)

8. (Currently Amended) ~~[[The]]~~ An information storage apparatus ~~of claim 1~~ comprising:
a cold cathode electron beam emitting part;
a flat anode opposed to the cold cathode electron beam emitting part; and
a storage medium formed on the front or back of the anode and used for storing or
reading information in accordance with irradiation with an electron beam emitted from the cold
cathode electron beam emitting part,

wherein the cold cathode electron beam emitting ~~means~~ part includes a cold cathode placed in a chamber surrounded by a partition and a film capable of transmitting an electron beam, and

the inside of the chamber has a vacuum degree higher than ~~the outside thereof~~ a space sandwiched between the film capable of transmitting an electron beam and the anode.

9. (Original) The information storage apparatus of claim 8, wherein an electron beam is accelerated by application of a given voltage to the film capable of transmitting an electron beam.

Claims 10-12 (Cancelled)

13. (Currently Amended) ~~[[The]]~~ An information storage apparatus ~~of claim 10,~~ comprising:

a cold cathode electron beam emitting part;

a flat anode opposed to the cold cathode electron beam emitting part;

a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with an electron beam emitted from the cold cathode electron beam emitting part; and

an accelerating part for accelerating the electron beam emitted from the cold cathode electron beam emitting part by using an electric field,

wherein the accelerating ~~means~~ part includes a plurality of electrodes to which voltages with different phases are respectively applied, and

the accelerating ~~means~~ part is configured to accelerate the electron beam by generating a moving electric field.

Claims 14-17 (Cancelled)

18. (Currently Amended) [[The] An information storage apparatus ~~of claim 1,~~
comprising:

a cold cathode electron beam emitting part;

a flat anode opposed to the cold cathode electron beam emitting part; and

a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with an electron beam emitted from the cold cathode electron beam emitting part.

wherein the cold cathode electron beam emitting ~~means~~ part includes a plurality of electron-beam emitting parts, and

the electron-beam emitting parts emit respective electron beams at different timings in accordance with a distance from a given center so as to ~~converge~~ cause the emitted electron beams to converge.

Claims 19-20 (Cancelled)

21. (Currently Amended) [[The]] An information storage apparatus ~~of claim 20~~
comprising:

a cold cathode electron beam emitting part;

a flat anode opposed to the cold cathode electron beam emitting part;
a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with an electron beam emitted from the cold cathode electron beam emitting part;
a shielding part including a plate member, having a minute hole and configured to generate an electric field for causing the electron beam emitted from the cold cathode electron beam emitting part to converge and pass through the minute hole; and
an actuator part for moving at least one of the shielding part and the storage medium along the surface of the other,
~~wherein the shielding means is configured to generate an electric field for causing the electron beam to converge and pass through the minute hole~~ a plurality of regions of the storage medium are allowed to be selectively irradiated with the electron beam.

22. (Currently Amended) The information storage apparatus of claim 21, wherein the shielding ~~means~~ part is configured to generate an electric field for causing the electron beam to converge and pass through the minute hole by application of a voltage to one of the plate member having conductivity and a conductive member provided on the plate member.

Claims 23-29 (Cancelled)

30. (Currently Amended) ~~[[The]] An information storage apparatus of claim 14, further comprising a plurality of cold cathode electron beam emitting means;~~

a plurality of cold cathode electron beam emitting parts;
a flat anode opposed to the cold cathode electron beam emitting parts;
a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with electron beams emitted from the cold cathode electron beam emitting parts;
a plurality of convergence parts for causing each of the electron beams emitted from the cold cathode electron beam emitting parts to converge by using an electric field or a magnetic

field; and

a plurality of deflection parts for deflecting each of the electron beams by using an electric field or a magnetic field,

wherein the deflection ~~means~~ parts and the convergence parts ~~[[is]]~~ are configured to ~~deflect~~ cause deflection and convergence of the electron beams emitted from the ~~plurality of cold cathode electron beam emitting means~~ parts in accordance with a common control signal so that a plurality of bits of information is stored and read out at the same time in/from a plurality of regions of the storage medium.

31. (Currently Amended) ~~[[The]]~~ An information storage apparatus ~~of claim 19, further comprising:~~

a plurality of cold cathode electron beam emitting means parts;

a flat anode opposed to the cold cathode electron beam emitting parts;

a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with electron beams emitted from the cold cathode electron beam emitting parts;

a shielding part for partly transmitting each of the electron beams emitted from the cold cathode electron beam emitting parts; and

an actuator part for moving at least one of the shielding part and the storage medium along the surface of the other in accordance with a control signal for each moving direction,

wherein ~~the shielding means is configured to partly transmit each of electron beams emitted from the plurality of cold cathode electron beam emitting means,~~

~~the actuator means is configured to move one of the shielding means and the storage medium in accordance with a control signal for each moving direction, and~~

a plurality of bits of information is stored or read out at the same time in/from a plurality of regions of the storage medium.

32. (Currently Amended) The information storage apparatus of claim 31, wherein the shielding ~~means~~ part includes a plate member having a plurality of minute holes associated with

the respective electron beams.

Claim 33

(Cancelled)

34. (Currently Amended) The information storage apparatus of claim 31, further comprising an irradiated-position-shift detecting means part for detecting a shift between a given reference position and a position in the storage medium irradiated with each of the electron beams in accordance with the movement of said one of the shielding ~~means part~~ and the storage medium by the actuator ~~means part~~,

wherein the position irradiated with each of the electron beams is controlled by the actuator ~~means part~~ in accordance with a result of the detection by the irradiated-position-shift detecting ~~means part~~.

35. (Currently Amended) The information storage apparatus of claim ~~[[33]]~~ 30, further comprising:

an irradiated-position detecting part for detecting a shift from a given reference position in accordance with a detection signal obtained when a irradiated-position detecting portion provided in part of the storage medium is irradiated with an electron beam emitted from at least one of the cold cathode electron beam emitting parts.

~~wherein the irradiated-position-shift detecting means detects a shift between a given reference position and a position in the storage medium irradiated with at least one electron beam emitted from at least one of the plurality of cold cathode electron beam emitting means, and~~

the position irradiated with the electron beam is controlled by the deflection parts and the convergence parts with respect to one or more electron beams emitted from the other cold cathode electron beam emitting parts in accordance with a result of the detection by the ~~irradiated-position-shift detecting means~~ irradiated-position detecting part.

36. (Currently Amended) The information storage apparatus of claim 34, wherein the irradiated-position-shift detecting ~~means part~~ is configured to detect a shift between a given

reference position and a position in the storage medium irradiated with at least one electron beam emitted from at least one of the ~~plurality of~~ cold cathode electron beam emitting ~~means~~ parts, and the position irradiated with the electron beam is controlled by the actuator ~~means~~ part with respect to one or more electron beams emitted from the other cold cathode electron beam emitting ~~means~~ parts in accordance with a result of the detection by the irradiated-position-shift detecting ~~means~~ part.

37. (Currently Amended) The information storage apparatus of claim 30, wherein an electron beam emitted from a part of the ~~plurality of~~ cold cathode electron beam emitting ~~means~~ parts is used to store and read at least one of error detecting code and error correcting code in storing or reading of information by using one or more electron beams emitted from the other cold cathode electron beam emitting ~~means~~ parts.

38. (Currently Amended) The information storage apparatus of claim 31, wherein an electron beam emitted from a part of the ~~plurality of~~ cold cathode electron beam emitting ~~means~~ parts is used to store or read at least one of error detecting code and error correcting code in storing or reading of information by using one or more electron beams emitted from the other cold cathode electron beam emitting ~~means~~ parts.

39. (New) The information storage apparatus of claim 35, wherein the irradiation-position detecting portion is a portion including a plurality of minute holes formed in the storage medium, and

the irradiated-position detecting part is configured to detect current flowing through the minute holes and perform leaning control in such a manner that control amounts of deflection and convergence at which current is largest is defined as control amounts of deflection and convergence at which a shift from the reference position is smallest.

40. (New) A method for storing information using an information storage apparatus comprising:

- a cold cathode electron beam emitting part;
 - a flat anode opposed to the cold cathode electron beam emitting part;
 - a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with an electron beam emitted from the cold cathode electron beam emitting part; and
 - an accelerating part for accelerating the electron beam emitted from the cold cathode electron beam emitting part by using an electric field,
- wherein a moving electric field is generated by applying voltages with different phases to a plurality of electrodes of the accelerating part, thereby accelerating the electron beam.

41. (New) A method for storing information using an information storage apparatus comprising:

- a cold cathode electron beam emitting part;
 - a flat anode opposed to the cold cathode electron beam emitting part; and
 - a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with an electron beam emitted from the cold cathode electron beam emitting part,
- wherein a plurality of electron-beam emitting parts of the cold cathode electron beam emitting part emit respective electron beams at different timings in accordance with a distance from a given center so as to cause the emitted electron beams to converge.

42. (New) A method for storing information using an information storage apparatus comprising:

- a cold cathode electron beam emitting part;
- a flat anode opposed to the cold cathode electron beam emitting part; and
- a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with an electron beam emitted from the cold cathode electron beam emitting part,

wherein a shielding part including a plate member having a minute hole generates an electric field for causing the electron beam emitted from the cold cathode electron beam emitting part to converge and pass through the minute hole, and

an actuator part causes at least one of the shielding part and the storage medium to move along the surface of the other so that a plurality of regions of the storage medium are allowed to be selectively irradiated with the electron beam.

43. (New) A method for storing information using an information storage apparatus comprising:

a plurality of cold cathode electron beam emitting parts;

a flat anode opposed to the cold cathode electron beam emitting parts;

a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with electron beams emitted from the cold cathode electron beam emitting parts;

a plurality of convergence parts for causing each of the electron beams emitted from the cold cathode electron beam emitting parts to converge by using an electric field or a magnetic field; and

a plurality of deflection parts for deflecting each of the electron beams by using an electric field or a magnetic field,

wherein the deflection parts and the convergence parts are controlled in accordance with a common control signal to cause deflection and convergence of the electron beams emitted from the cold cathode electron beam emitting parts so that a plurality of bits of information is stored and read out at the same time in/from a plurality of regions of the storage medium.

44. (New) A method for storing information using an information storage apparatus comprising:

a plurality of cold cathode electron beam emitting parts;

a flat anode opposed to the cold cathode electron beam emitting parts;

a storage medium formed on the front or back of the anode and used for storing or reading information in accordance with irradiation with electron beams emitted from the cold

cathode electron beam emitting parts;

a shielding part for partly transmitting each of the electron beams emitted from the cold cathode electron beam emitting parts; and

an actuator part for moving at least one of the shielding part and the storage medium along the surface of the other,

wherein the actuator part is driven in accordance with a control signal for each moving direction, and

a plurality of bits of information is stored or read out at the same time in/from a plurality of regions of the storage medium.